



## A NEW SPECIES OF *BEGONIA* (BEGONIACEAE) FROM INDONESIA AND TIMOR-LESTE

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A new rhizomatous, lithophytic species of *Begonia* (Begoniaceae – *Begonia* sect. *Jackia*) is described from material collected from limestone areas in the Indonesian and Timor-Leste parts of the island of Timor, Lesser Sunda Isles. Photographs, a provisional conservation status assessment of the new species, and an identification key to species of *Begonia* sect. *Jackia* in the Lesser Sunda Isles are provided.

**Keywords.** Endemism, limestone karst.

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### Introduction

The *Begonia* flora of the largest island of the Lesser Sunda Isles, Timor, remains very poorly understood and is poorly collected. The *Begonia* Resource Centre (Hughes *et al.*, 2015–) and the Naturalis Bioportal (<https://bioportal.naturalis.nl>) indicate only five *Begonia* collections from the island. Only two species have been reported from the island, including *Begonia longifolia* Blume, which has a wide distribution in tropical Southeast Asia, and the poorly known *B. timorensis* (Miq.) Golding & Kareg. The latter name may be a synonym of *Begonia longifolia*. Hughes (2008) noted that the “previously applied ‘aptera’ epithet raises the possibility that this is merely an extension to the range of the widespread *B. longifolia*, although I have not seen any specimens.” Previous descriptions of *Begonia timorensis* and its heterotypic synonyms (e.g. Decaisne, 1834; Miquel, 1856) indicate that it has stamens with apically extended connectives (typical of *Begonia* sect. *Platycentrum*), 4-tepalled male flowers, and fruits without wings. This is a character combination that is rare in Asian begonias but characteristic for *Begonia longifolia*, whose geographical range includes Timor (Forbes 3863 [BM]). However, type material of *Begonia timorensis* could not be located to confirm this.

Given the size of Timor (30,780 km<sup>2</sup>) and the presence of suitable habitats for begonias, including extensive limestone formations, it seems very likely that botanical exploration will

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lead to more discoveries of *Begonia* species from the island. The much smaller island of Bali (5780 km<sup>2</sup>), for comparison, has a *Begonia* flora of eight species (Girmansyah, 2009; Ardi *et al.*, 2013).

*Begonia* material collected on a recent field trip to Timor-Leste could be assigned to *Begonia* sect. *Jackia*, because it showed typical characters of the section: an acaulescent, rhizomatous growth habit, male flowers with four tepals, female flowers with three or four tepals, and ovaries with three subequal wings, three locules, and axile, entire placentae (Moonlight *et al.*, 2018). Recent publications have provided some insights into the diversity of the *Begonia* flora of the Lesser Sunda Isles, including a revision of Bali *Begonia* (Girmansyah, 2009) and the description of a new species from Bali (Ardi *et al.*, 2013), descriptions of five new species and an identification key to Sumbawa *Begonia* (Undaharta *et al.*, 2015; Girmansyah, 2016a, 2016b), and new species description and an identification key to Lombok *Begonia* (Ardi *et al.*, 2013). These papers included descriptions of several species of *Begonia* sect. *Jackia*: two species were described from Bali (Girmansyah, 2009; Ardi *et al.*, 2013), one from Lombok (Ardi *et al.*, 2013), and three from Sumbawa (Undaharta *et al.*, 2015; Girmansyah, 2016a, 2016b). Moreover, recent descriptions of three new species from Sulawesi (Ardi *et al.*, 2018; Thomas & Ardi, 2020) substantially extended the eastern boundary of the section's known distribution. In comparison with the seven species of *Begonia* sect. *Jackia* previously reported from the Lesser Sunda Isles (Table), the material from Timor is morphologically most similar to *Begonia pseudomuricata* Girm. and *B. lugrae* Ardhaka & Undaharta from Bali, but it differs in several vegetative and reproductive characters (see diagnosis, identification key and notes below).

### Key to species of *Begonia* sect. *Jackia* in the Lesser Sunda Isles

- 1a. Plant tuberous \_\_\_\_\_ 2  
 1b. Plant rhizomatous \_\_\_\_\_ 3

**Table.** Species of *Begonia* sect. *Jackia* from the Lesser Sunda Isles, and their distribution

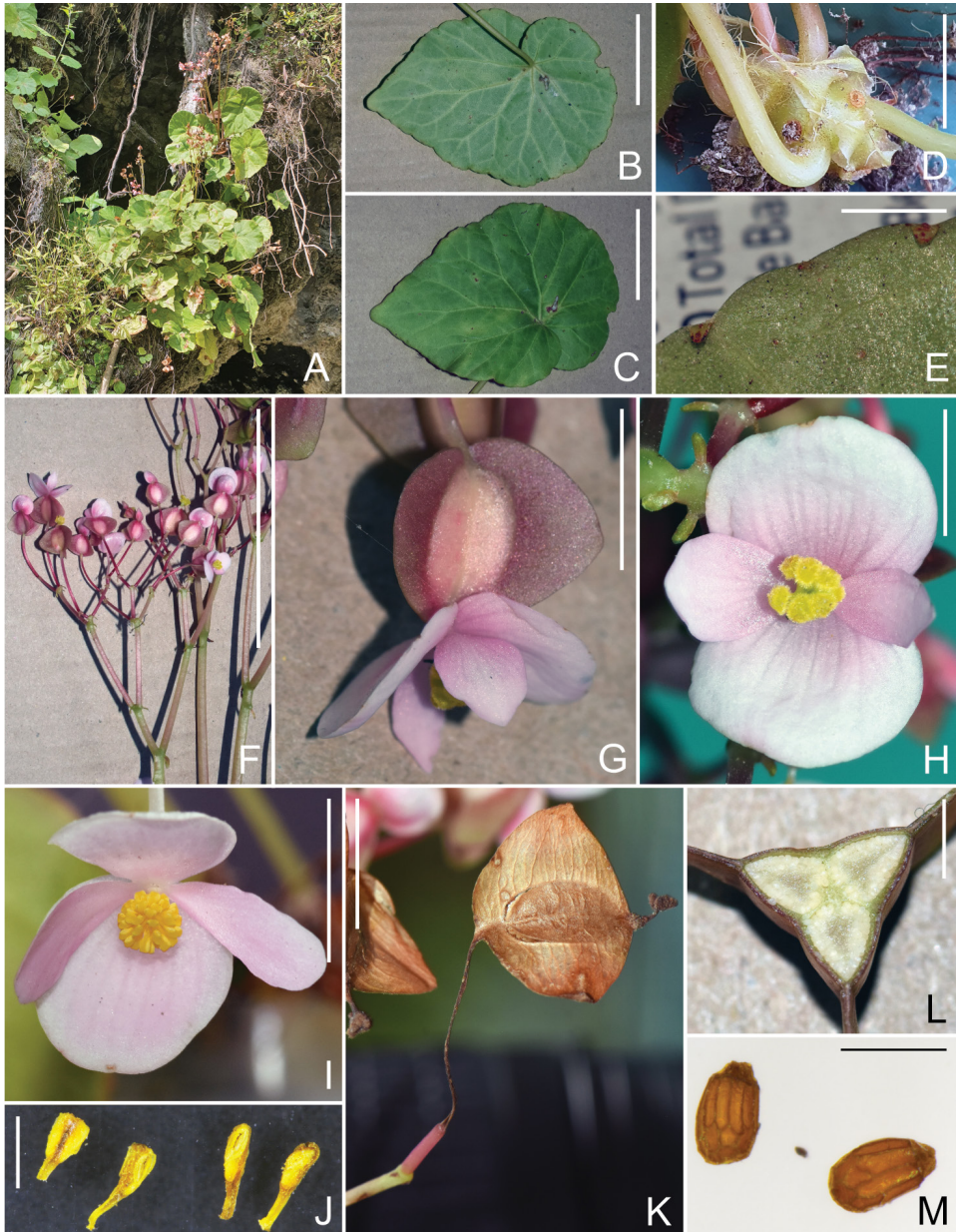
Species	Distribution
<i>Begonia bimaensis</i> Undaharta & Ardhaka	Sumbawa
<i>Begonia coriacea</i> Hassk.	Sumatra, Java, Bali
<i>Begonia lugrae</i> Ardhaka & Undaharta	Bali
<i>Begonia pseudomuricata</i> Girm.	Bali
<i>Begonia semongkatensis</i> Girm.	Sumbawa
<i>Begonia sendangensis</i> Ardi	Lombok
<i>Begonia stilpnophylla</i> D.C.Thomas & Ardi	Timor
<i>Begonia sumbawaensis</i> Girm.	Sumbawa

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- 2a. Lamina adaxially glabrous; female flowers with 3 tepals, ovary wings rounded at base, rounded to truncate at the apex; Lombok \_\_\_\_\_ *B. sendangensis*
- 2b. Lamina adaxially densely covered with white pilose hairs; female flowers with 4 tepals, ovary wings triangular and mostly cuneate at the apex; Sumbawa \_\_\_\_\_ *B. bimaensis*
- 3a. Leaves peltate; Sumatra, Java, Bali \_\_\_\_\_ *Begonia coriacea*
- 3b. Leaves basifixed \_\_\_\_\_ 4
- 4a. Leaf lamina hairy on both surfaces \_\_\_\_\_ 5
- 4b. Leaf lamina glabrous on both surfaces \_\_\_\_\_ 6
- 5a. Plant small, up to 16 cm tall; rhizome with strongly compressed internodes (c.1 mm long); leaf lamina ovate, adaxial surface with sparse short glandular hairs and abaxially with sparse villose hairs; androecium of 24 stamens; fruit pedicels 1–1.5 cm long; Sumbawa \_\_\_\_\_ *B. semongkatensis*
- 5b. Plant larger, up to 30 cm tall; rhizome with longer internodes (5–10 mm long); leaf lamina suborbicular to broadly ovate, adaxially glabrescent to sparsely puberulous and abaxially moderately hairy between the veins and densely pubescent along the veins; androecium of 48 stamens; fruit pedicels 2.2–3 cm long; Sumbawa \_\_\_\_\_ *B. sumbawaensis*
- 6a. Stipules semicircular; petioles 24–33.5 cm long, longer than the inflorescences \_\_\_\_\_ *Begonia lugrae*
- 6b. Stipules ovate-triangular; petioles 4.8–20 cm long, shorter than the inflorescences \_\_\_\_\_ 7
- 7a. Rhizome internodes strongly compressed, 2–5 mm long; petioles glabrous; female flower tepals (3 or) 4; male flower inner tepals 12–14 mm long; Timor \_\_\_\_\_ *B. stilpnophylla*
- 7b. Rhizome internodes c.10 mm long; petioles sparsely to moderately hairy; female flower tepals 3; male flower inner tepals 15–19 mm long; Bali \_\_\_\_\_ *B. pseudomuricata*

### Taxonomic treatment

#### *Begonia stilpnophylla* D.C.Thomas & Ardi, sp. nov. [Section *Jackia*]

This species is morphologically similar to *Begonia pseudomuricata* Girm. from Bali but differs by its more strongly compressed rhizome internodes (2–5 mm vs c.10 mm long), glabrous petioles (vs sparsely to moderately densely hairy), smaller tepals of the male flowers (outer 10–11 × 8–9 mm, inner 12–14 × 6 mm vs outer 12–15 × 11–12 mm, inner 15–19 × 7 mm) and female flowers (outer 7–8 × 7–8 mm, inner 5 × 2–4 mm vs outer 10–11 × 9–10 mm, inner 9–10 × 3–4 mm). – Type: Timor-Leste, Viqueque Municipality, Loihuno, S of Loihuno waterfall, 8°47'10.501"S, 126°22'49.624"E, 257 m elevation, D.C. Thomas 3494, 29 viii 2022 (holotype SING, isotype E). [Figure 1](#).



**Figure 1.** *Begonia stilpnophylla* D.C.Thomas & Ardi, sp. nov. A, Habit; B, leaf, abaxial surface; C, leaf, adaxial surface; D, rhizome and stipules; E, leaf margin with reflexed teeth; F, dichasial-cymose inflorescence; G, female flower, side view; H, female flower, front view; I, male flower, front view; J, stamens; K, fruit; L, ovary, cross-section; M, seed. Scale bars: B, C and F, 10 cm; D, 2 cm; E, G and K, 1 cm; H, 5 mm; I, 12 mm; J, 1 mm; L, 3 mm; M, 300  $\mu$ m. All photographs of D. C. Thomas 3494, taken by D. C. Thomas.

Acaulescent, rhizomatous, perennial herb, to 38 cm tall. *Rhizome* to 11 cm long, with strongly compressed internodes, 2–5 mm long. *Leaves* alternate; stipules ovate-triangular, 18–25 × 10–12 mm, apex narrowed into a bristle up to 16 mm long, glabrous except for the hairy apical bristle, persistent; petiole 4.8–12.8 cm, glabrous, green to reddish; lamina basifixed, asymmetrical, 5.8–17.5 × 3.9–12.2 cm, ovate to elliptic, base cordate, basal lobes overlapping, apex acute to acuminate, adaxial surface green and with pale green veins, glabrous, abaxial surface pale green to greenish-reddish, paler light green along the veins, glossy, glabrous, margin sinuate, repand or shallowly lobed, distantly toothed, teeth often reflexed, sometimes with bristle at apex, margin sometimes distantly ciliate; venation palmate with 5 or 6 primary veins, secondary veins craspedodromous. *Inflorescence* protandrous, axillary, dichasial-cymose, few- to many-flowered, 8–36 cm long; peduncle 5.8–18.5 cm long; bracts narrowly ovate, narrowly elliptic to narrowly obovate, caducous, to c.2 × 1 mm, smaller in the distal part of the inflorescence, sometimes the basal bracts with a few hairs abaxially. *Male flower* pedicel 8–9 mm long, white to pinkish; tepals 4, white tinged with pink, glabrous, unequal, outer elliptic, 10–11 × 8–9 mm, inner obovate, 12–14 × 6 mm; androecium yellow, symmetrical, globose, stalked at base, filament column c.1 mm long; stamens 38–44, to c.1.5 mm long, filaments to 0.7 mm long; anthers to 0.8 mm long, dehiscent through lateral slits longer than half of the anther, apex truncate-retuse. *Female flower* pedicel 15–22 mm long, pinkish to reddish; tepals (3 or) 4, pink or white tinged with pink, unequal, outer broadly ovate, 7–8 × 7–8 mm, inner ovate to elliptic, 5 × 2–4 mm, glabrous; ovary 7–8 × 4 mm (excluding the wings), ellipsoid, green, greenish tinged with pink, or pink, wings subequal, to 4 mm wide at the widest point (middle part), convex to cuneate at the base and apex; style to c.3 mm long, fused at base for c.1 mm; stylopodia 3; stigmas 3, U-shaped, stigmatic surface spirally twisted, papillose. *Fruit* pedicel to 22 mm long; dry capsule dehiscent through lines along the wing attachment, seed-bearing part ellipsoid, 9–10 × 4–6 mm, wing shape as for ovary, wings to 6 mm at the widest point (middle part). *Seeds* barrel-shaped, 300–320 µm long, collar cells > 1/2 the length of the seed.

*Distribution.* Indonesia, Timor-Leste; endemic to Timor ([Figure 2](#)).

*Habitat and ecology.* In crevices and on ledges on limestone cliffs, cave entrances and limestone boulders, in semi-shade, from 250 to 1300 m elevation.

*Etymology.* Greek, *stilpnos* ('sparkling', 'glittering') and *-phyllos* ('leafed') – a reference to the way light reflects from the lower leaf surface (see [Figure 1E](#)).

*Proposed IUCN conservation category.* Endangered (EN) B1ab(iii)+2ab(iii). The recent collections of this species in Viqueque Municipality, Timor-Leste, were made in areas that showed severely disturbed vegetation and ongoing major anthropogenic disturbances including grazing of livestock, road construction and settlements. The collection on Monte



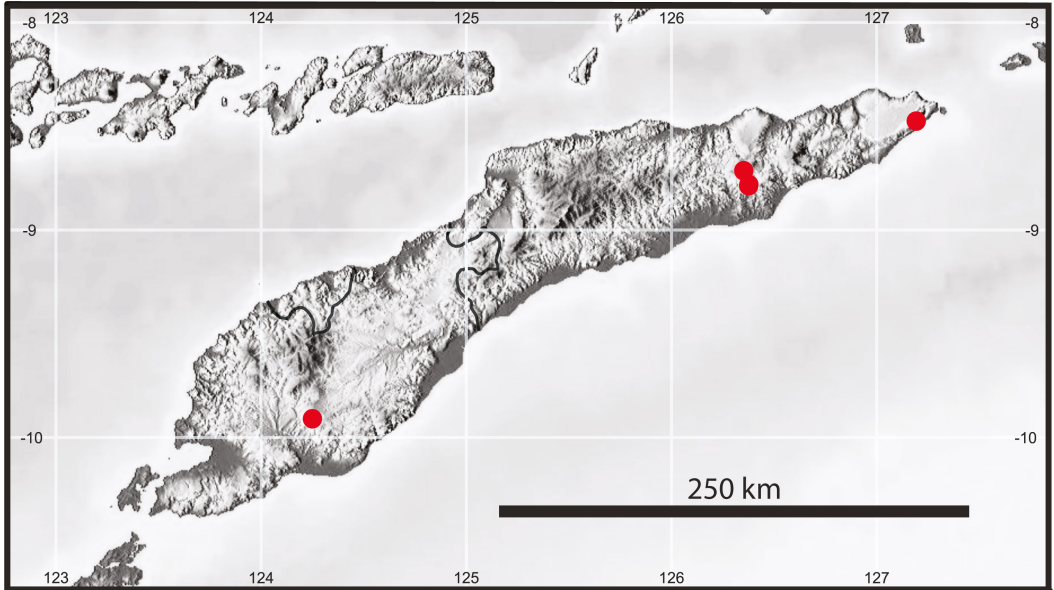


Figure 2. Distribution of *Begonia stilpnophylla* D.C. Thomas & Ardi, sp. nov. (red circles) on Timor, Lesser Sunda Isles. Graticules indicate degrees of latitude and longitude.

Munde Perdido was made from a small limestone rock outcrop surrounded by a grass pasture. Although *Begonia stilpnophylla* was locally abundant and tolerated some degree of disturbance, some individuals in degraded, sun-exposed habitats showed clear signs of sun damage. One recent collection was made in the legally protected Nino Konis Santana National Park, but there is very limited enforcement, and disturbance by livestock grazing, logging and fire could be observed at the margin of the National Park. Timor is botanically poorly explored, but given that this species seems to be restricted to limestone outcrops, the observed ongoing disturbances of its habitats, its fragmented distribution, and based on currently available material, an extent of occurrence of less than 5000 km<sup>2</sup>, it is assessed as Endangered.

*Notes.* The leaf morphology of *Begonia stilpnophylla*, including the relatively long petioles, relatively large, basifixed leaf laminas with a sinuate, repand or sometimes shallowly lobed leaf margin, and distant, small and frequently reflexed teeth, is similar to the leaf morphology found in two species from Bali, *B. pseudomuricata* and *B. lugrae*. Differences from *Begonia pseudomuricata* are elaborated on in the diagnosis. *Begonia lugrae* has characteristic semicircular stipules and very long petioles (24–33.5 cm long) that are longer than the inflorescences (Undaharta *et al.*, 2015), whereas in *B. stilpnophylla* the stipules are ovate-triangular and the petioles to 12.8 cm long and shorter than the inflorescences, which can reach to 36 cm in length.

*Additional specimens examined.* INDONESIA. Lesser Sunda Isles, Timor: Nasimetan, S of Kapan, 900 m elevation, 17 iii 1939, S. Bloembergen 3488 (BO, K).

TIMOR-LESTE. Timor: Muapitine, Plateau of Fuloro, Lautem, 350 m, 19 xii 1953, C.G.G.J. van Steenis 18143 (BM, L [L2469474]); Mt Paitxau [Paitchau] Range, near Malahara, Lautem, 830 m elevation, 1 iii 2006, I.D. Cowie 11048 (L [L3737987]); Port. Timor, 1 i 1962, R. Cinatti 298 (L [L2469461]); Viqueque Municipality, Monte Mundo Perdido, 1289 m elevation, 29 viii 2022, D.C. Thomas 3492 (E, SING); Viqueque Municipality, Loihuno, 257 m elevation, 29 viii 2022, D.C. Thomas 3493 (E, SING).

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